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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/480,076	01/10/2000	RICKIE C. LAKE	M140-274	3868

7590

05/22/2002

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EXAMINER

HARAN, JOHN T

ART UNIT

PAPER NUMBER

1733

10

DATE MAILED: 05/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/480,076

Applicant(s)

LAKE, RICKIE C.

Examiner

John T. Haran

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 April 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9,10,12-14 and 16-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9,10,12-14 and 16-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

1. This office action is in response to amendment C filed on 4/19/02.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9-14 and 23-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, the phrase "curing the adhesive into an electrically conductive bond electrically interconnecting the first and second components" renders the claim indefinite because it is unclear what is required of the adhesive. Is the adhesive electrically conductive? It appears that it is and it is suggested to specify that the adhesive is conductive by replacing all instances of "curable adhesive" with - - curable, electrically conductive adhesive - - in order to clarify this issue.

The same problem exists with the phrase "curing the epoxy into an electrically conductive bond electrically interconnecting the first and second components" in claim 23, and should be similarly fixed by specifying the epoxy is electrically conductive.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9, 12-14 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (U.S. Patent 4,975,221) in view of Tsukagoshi et al (U.S. Patent 5,843,251).

Chen et al discloses a curable epoxy adhesive for use in attaching electrical components together, such as semiconductor die or chips to a substrate, to form a connection wherein the epoxy adhesive contains an electrically conductive filler and an epoxy functional silane adhesion promotor (Column 1, lines 5-11 and Column 3, line 59 to Column 4, line 5).

While Chen et al is silent towards the specifics of using the adhesive to electrically interconnect electrical components, it would have been obvious to one of ordinary skill in the art at the time the invention was made that in order to form an electrical connection between two electrical components with an adhesive, the adhesive must be interposed between the components and cured.

Chen et al are silent towards the type of silane utilized as the adhesion promotor, however Chen et al do teach any type of epoxy terminated silanes are suitable as the adhesion promotor (Column 4, lines 4-5).

Glycidoxy methoxy silanes are well known and conventional adhesion promoters/coupling agents, as evidenced for example in Tsukagoshi et al. Tsukagoshi et al is directed to a method for electrically connecting circuits by interposing an epoxy adhesive between two circuits (Column 3, lines 30-35). The reference teaches adding a silane coupling agent to the epoxy in order to strengthening the adhesive interface of the circuits and to improve moisture

resistance, such as glycidoxypyltrimethoxysilane (Column 10, line 62 to Column 11, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a known silane adhesion promotor, such as glycidoxypyltrimethoxysilane, in the epoxy adhesive in the method of Chen et al.

Regarding claims 23-25, it is well known and conventional that silane coupling agents are low in molecular weight and mostly liquid at normal temperature and consequently increase the fluidity of the adhesive and thereby reduces contact resistance, as shown for example in Tsukagoshi et al (Column 12, lines 12-20). One skilled in the art would have readily appreciated that only the expected results would be achieved by adding a silane coupling agent to an electrically conductive epoxy adhesive, such as changing the contact resistance. One skilled in the art would be expected to know the desirable contact resistance and to appropriately adjust the adhesive utilized in order to achieve an acceptable contact resistance, such as adjusting metal surface wetting concentration of silane in the epoxy. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an effective metal surface wetting concentration of silane in the adhesive to obtain the desired contact resistance in the method of Chen et al, as modified above.

Regarding claims 13-14 and 26-27, it would have been obvious to utilize the desired weight percentages of the epoxy terminated silane in the adhesive composition and only the expected would be achieved. Furthermore, Chen et al

teach having the adhesion promotor be 0 to 2 percent by weight (Column 4, lines 15-20).

6. Claims 10 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al in view of Tsukagoshi et al as applied to claims 9 and 23 above, and further in view of Tuttle (U.S. Patent 5,558,679).

One skilled in the art would have readily appreciated that it is well known and conventional to electrically interconnect electronic components via an epoxy adhesive wherein one of the electronic components a surface with metal containing nickel, as shown for example in Tuttle (Column 3, lines 60-61) and that Chen et al are a general teaching for interconnecting electronic parts. It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect an electrical component with a nickel containing metal surface to another electrical component in the method of Chen et al, as modified above, as suggested in Tuttle.

### ***Response to Arguments***

7. Applicant's arguments filed 4/19/02 have been fully considered but they are not persuasive.

In regards to the indefiniteness rejection, claims 9 and 23 are indefinite because one skilled in the art would not have appreciated what properties are required of the adhesive.

In regards to claim 9, there is ample motivation to modify Chen et al with Tsukagoshi et al. Chen et al teach electrically interconnecting electrical components with an adhesive containing epoxy terminated silanes as adhesion promoters. It is well known and conventional that glycidoxy methoxy silanes, such as glycidoxypropyltrimethoxysilane, are adhesion promoters/coupling agents, as shown for example Tsukagoshi et al.

In regards to claim 23, it is well known and conventional that silane coupling agents are low in molecular weight and mostly liquid at normal temperature and consequently increase the fluidity of the adhesive and thereby reduces contact resistance, as shown for example in Tsukagoshi et al (Column 12, lines 12-20). One skilled in the art would have readily appreciated that only the expected results would be achieved by adding a silane coupling agent to an electrically conductive epoxy adhesive, such as changing the contact resistance. One skilled in the art would be expected to know the desirable contact resistance and to appropriately adjust the adhesive utilized in order to achieve an acceptable contact resistance, such as adjusting metal surface wetting concentration of silane in the epoxy.

In regards to claims 10 and 28, it is well known and conventional to electrically interconnect electronic components via an epoxy adhesive wherein one of the electronic components a surface with metal containing nickel, as shown for example in Tuttle (Column 3, lines 60-61).

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

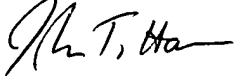
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(703) 305-0052**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.




Any inquiry of a general nature or relating to the status of this application  
or proceeding should be directed to the receptionist whose telephone number is

(703) 308-0661.



John T. Haran

May 21, 2002



Michael W. Bell  
Executive Director  
Technology Center 700